

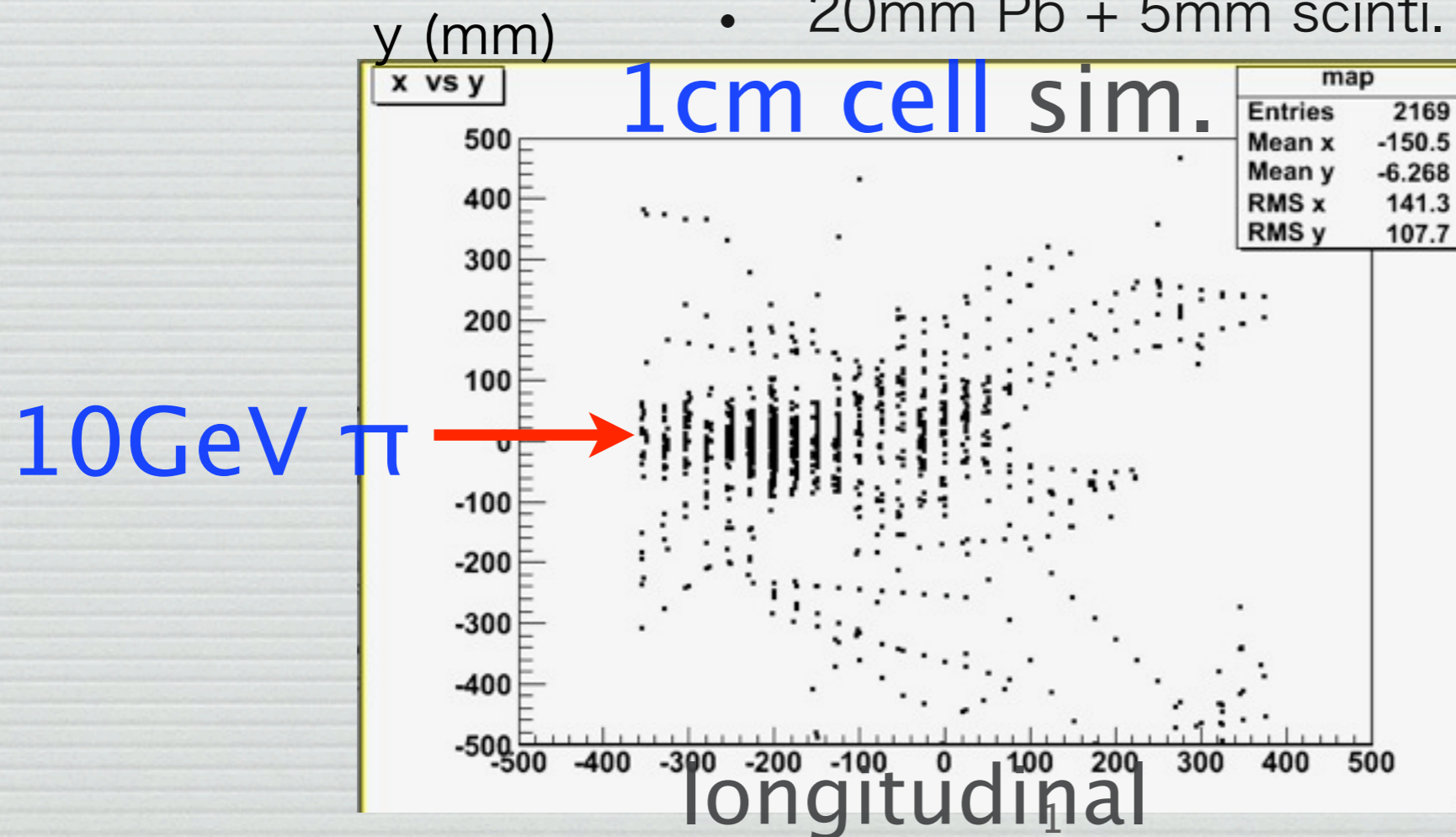
strip HCAL



T.Takeshita (Shinshu)

since reconstruction of hadron showers is the issue, fine spacial resolution will improve tracking capability

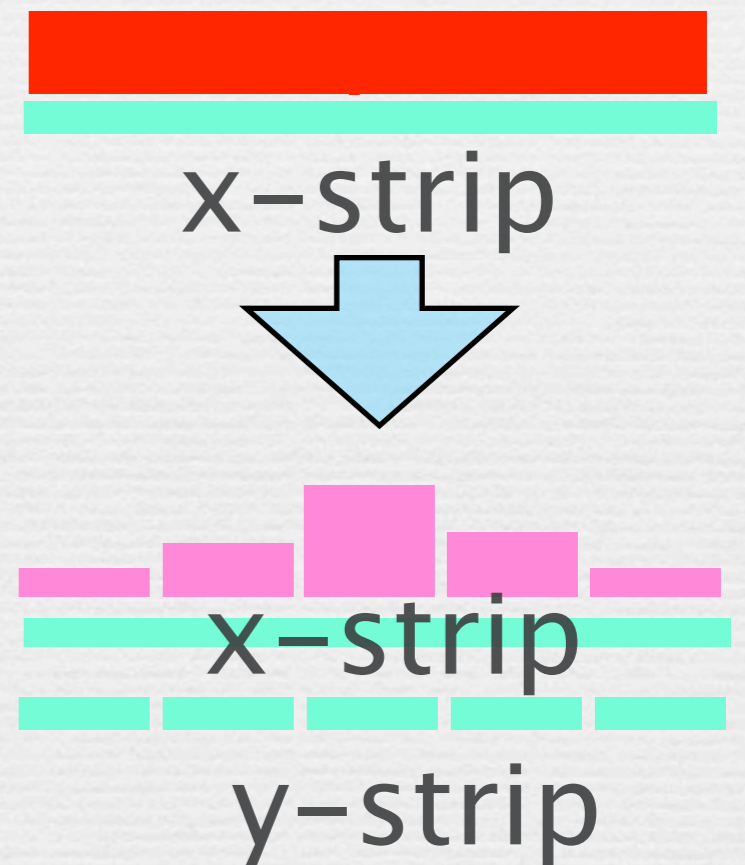
- 20mm Pb + 5mm scinti. 30 layers



SSA

- Katsu contrived and is developing
- SSA is **Strip Splitting Algorithm**
- energy in a strip is divided into the parts depending on the energy measured in front and back layer which lie in right angle
- for EM shower, it works well
- how about hadron shower ?
- for hadron shower, particle density is pretty small

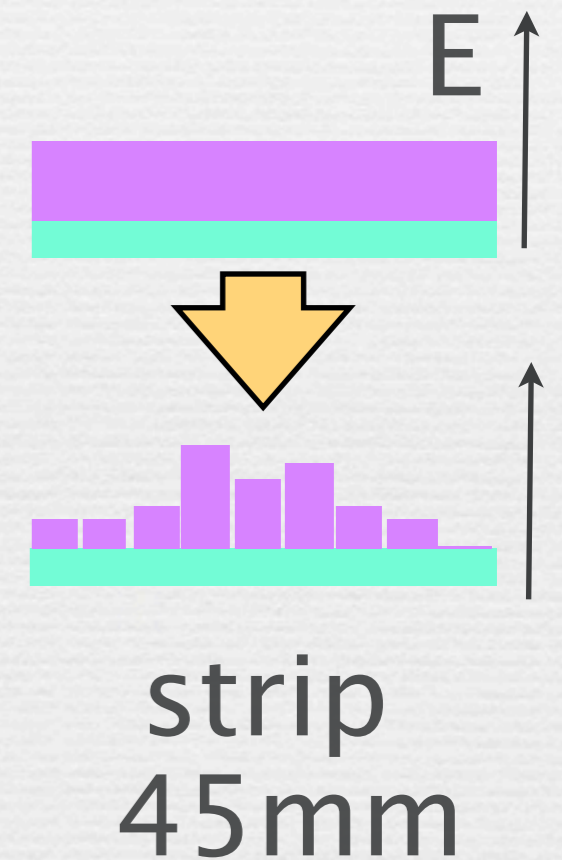
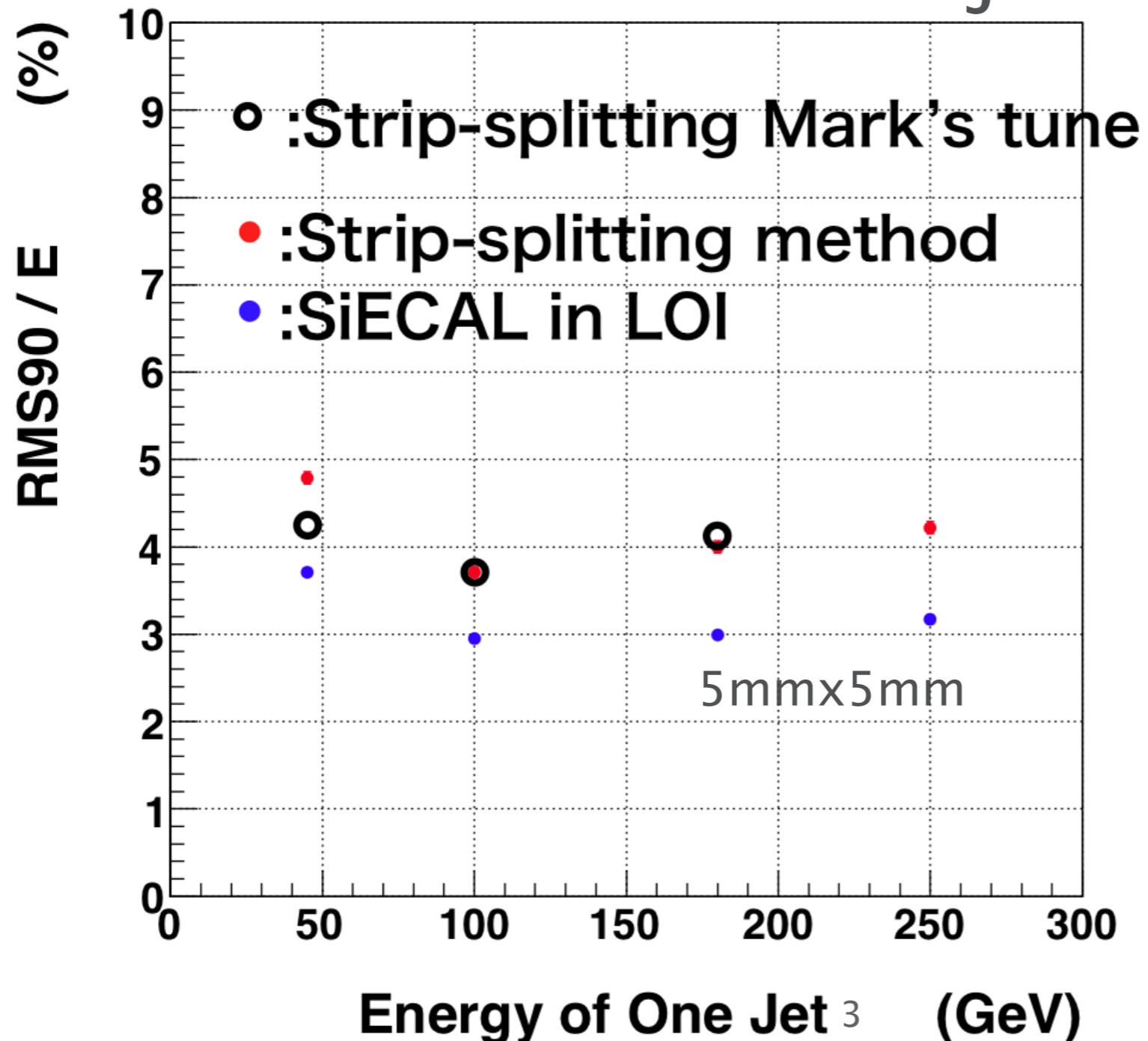
measured E



SSA for EM shower

- energy re-sharing into virtual cells of 5mm x 5mm

Pandora results for jets



A revival of our work

2002

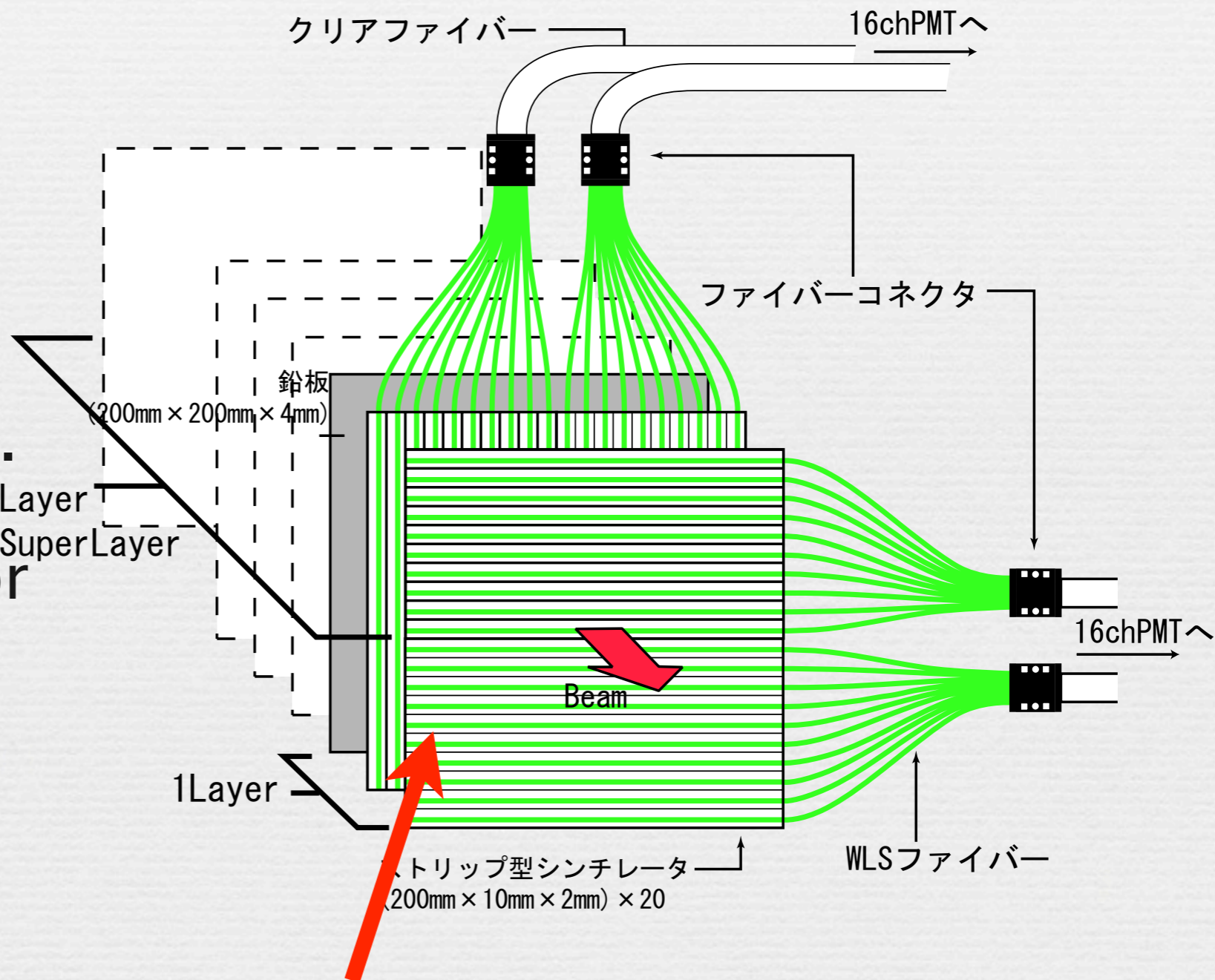
1cm x 20cm x 0.2cm strip with WLSF read out

Multi Anode PMT

adding 4 layers in a ch.

lack of # of photons for a MIP

now we've improved it



FOR **ECAL**

A revival of our work

2002

1cm x 20cm x 0.2cm strip with WLSF read out

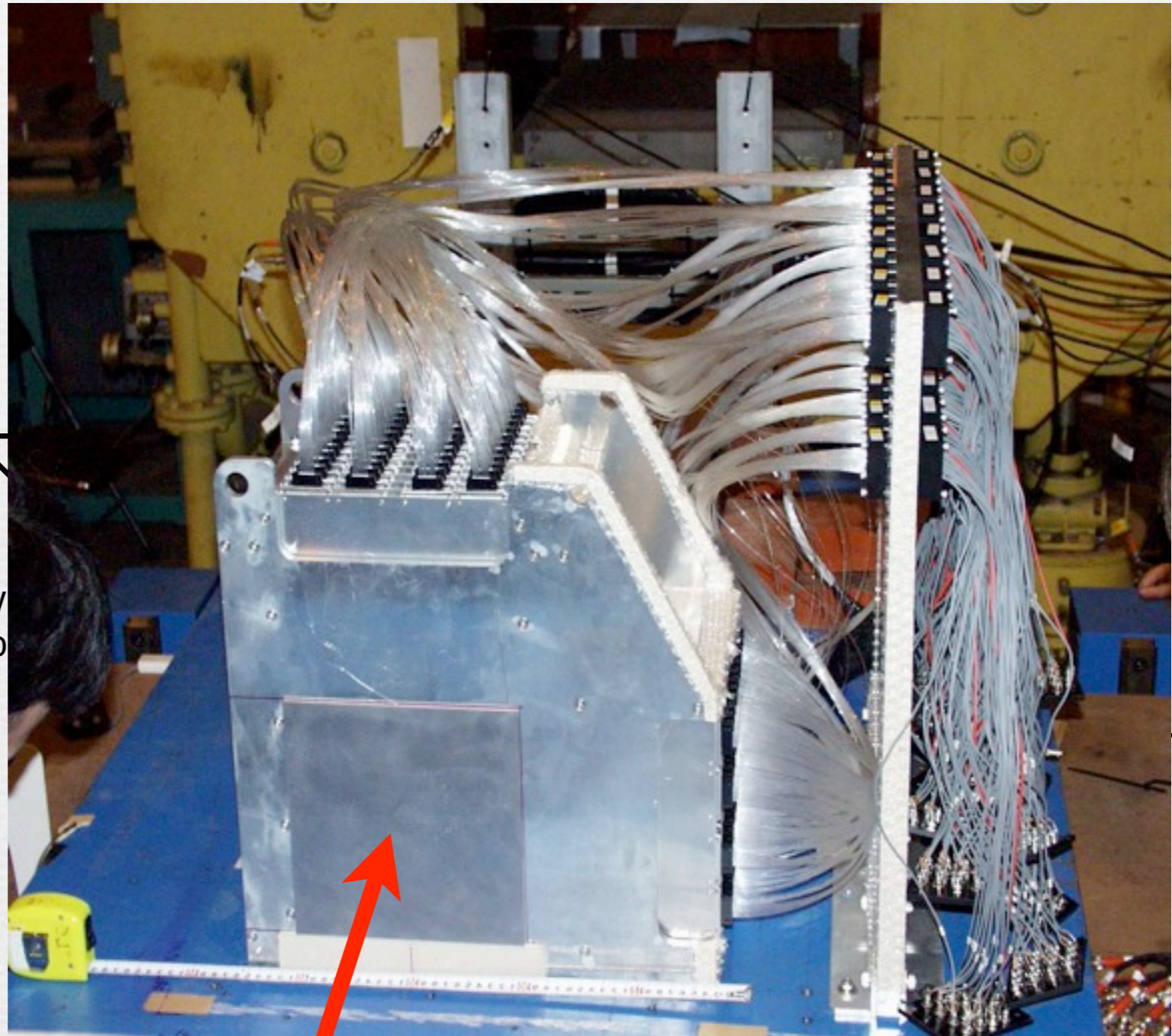
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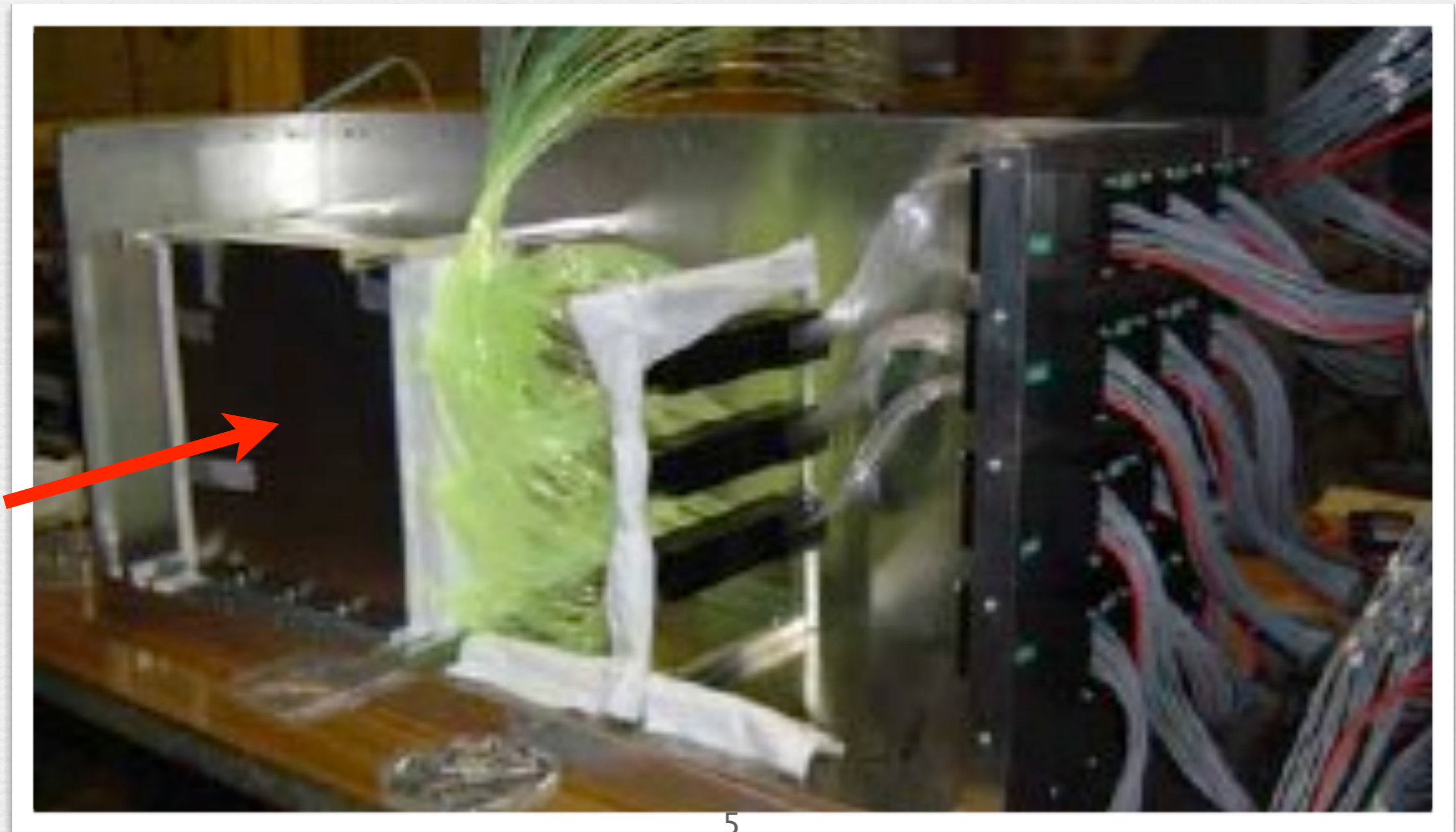
tile ECAL

- 4cm x 4 cm tile of 1mm thick scintillator with WLSF
- MAPMT read out



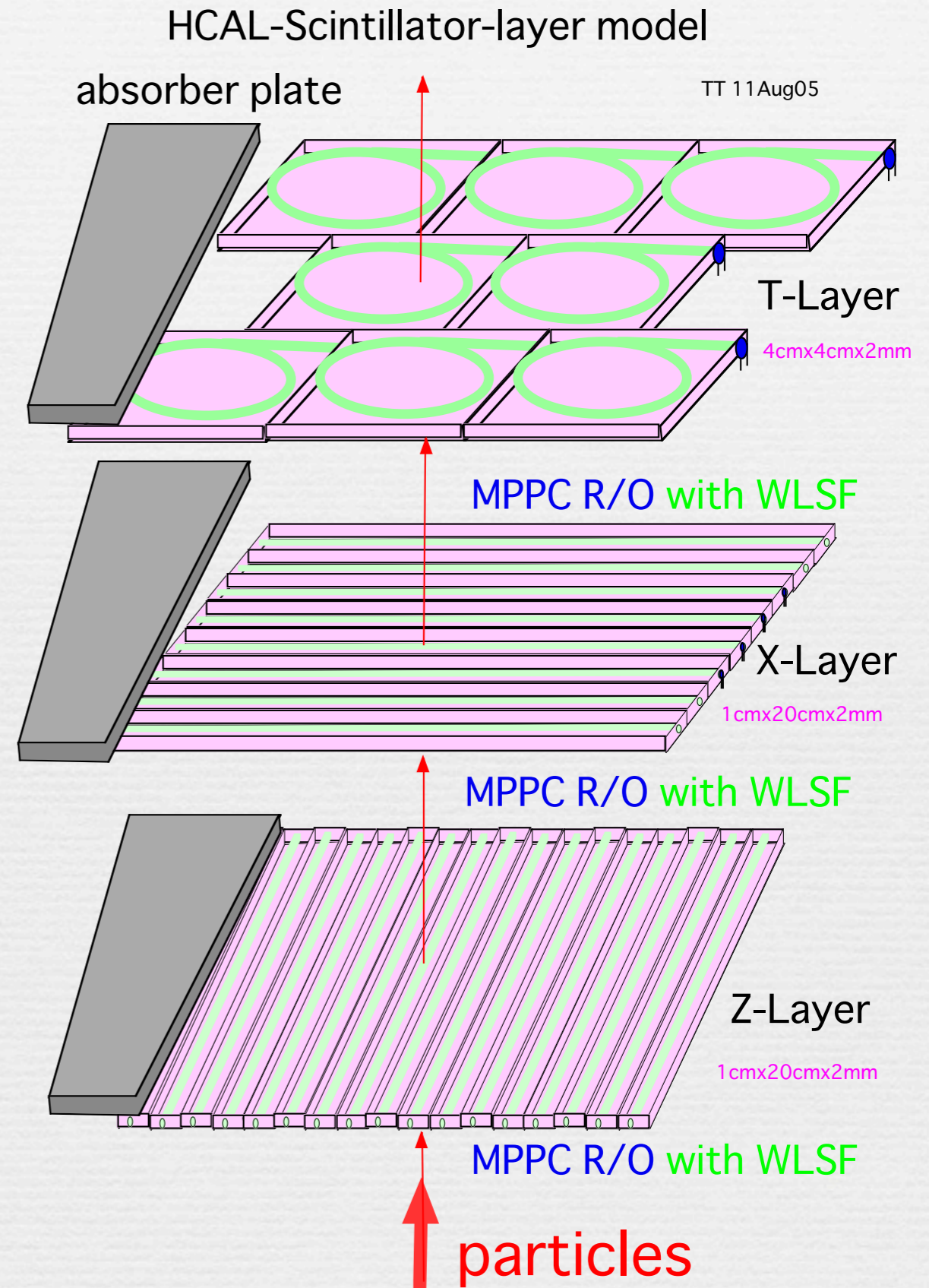
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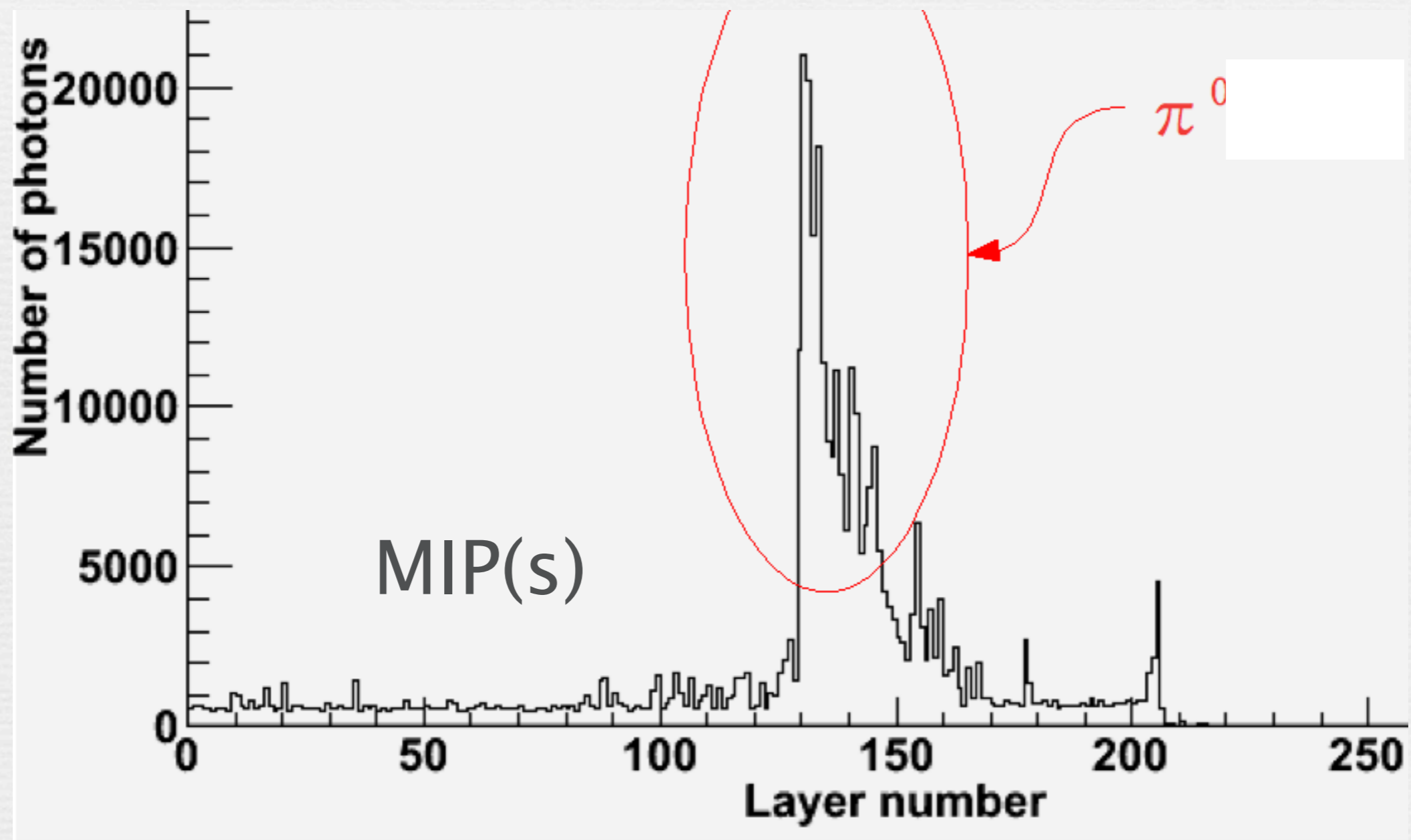
GLD-CAL

- we proposed an HCAL for GLD
- at that time, we did not have SSA



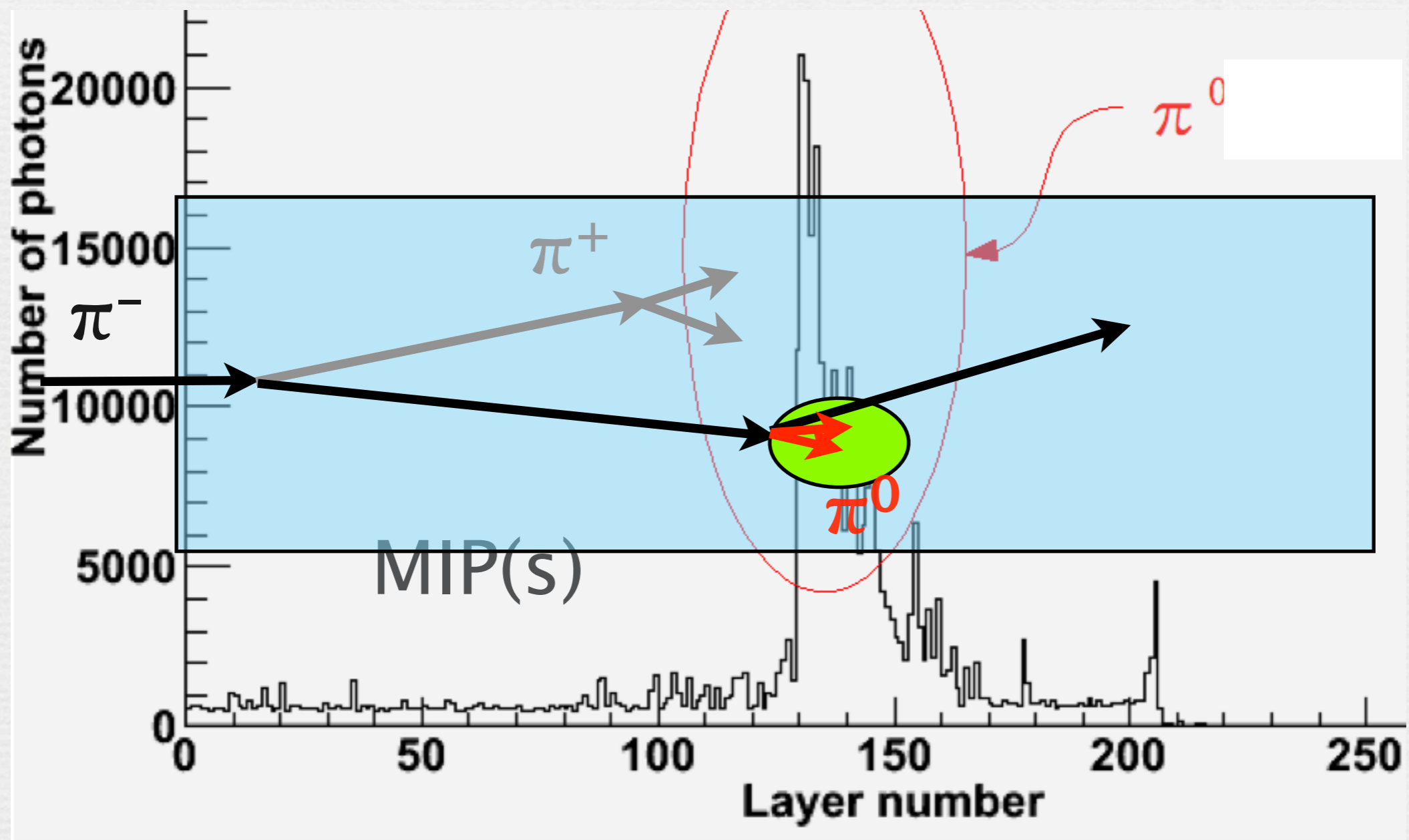
Hadron shower

- MIX of charged π/K & neutral pion, EM shower longitudinal profile



Hadron shower

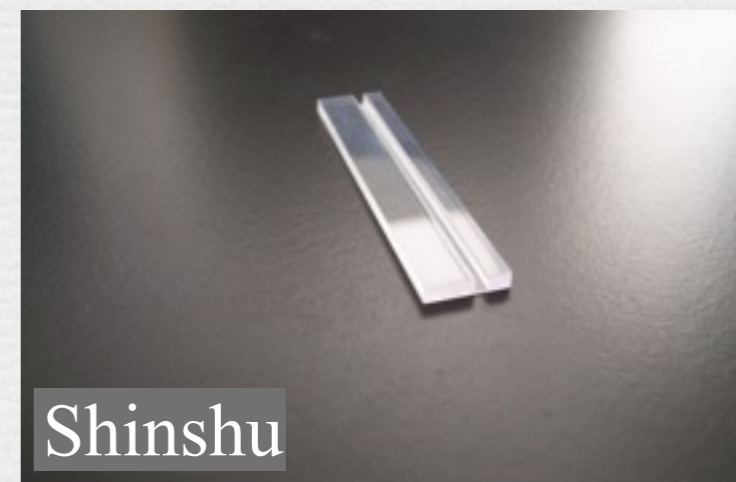
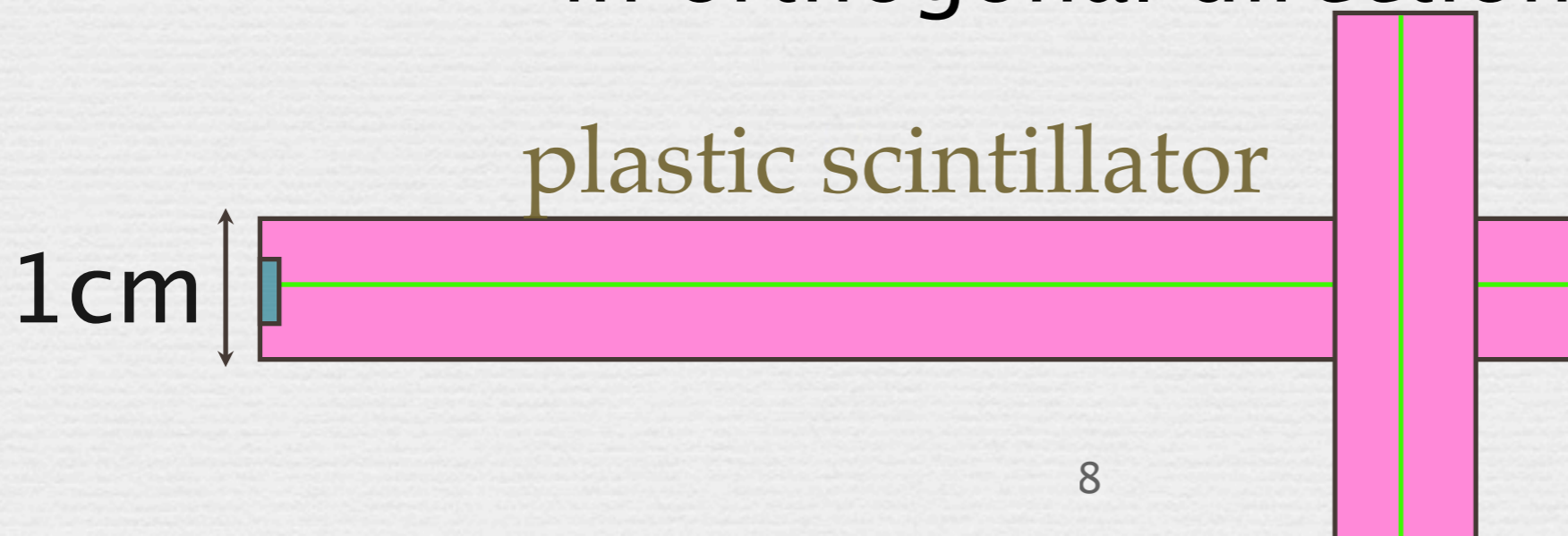
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Hadron shower reconstruction

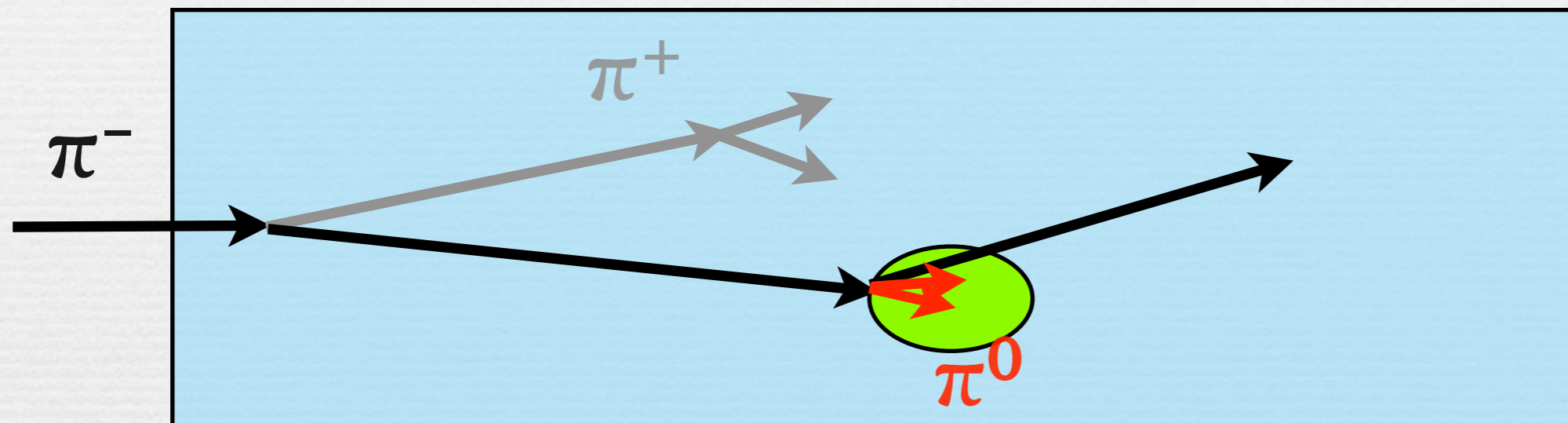
- Tracking with fine segmentation in 3D

1cm x 1cm spacial resolution with strip scintillators in orthogonal directions

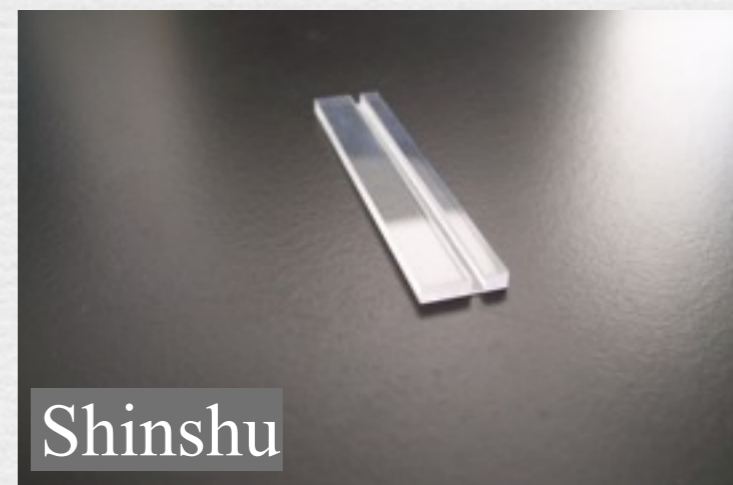
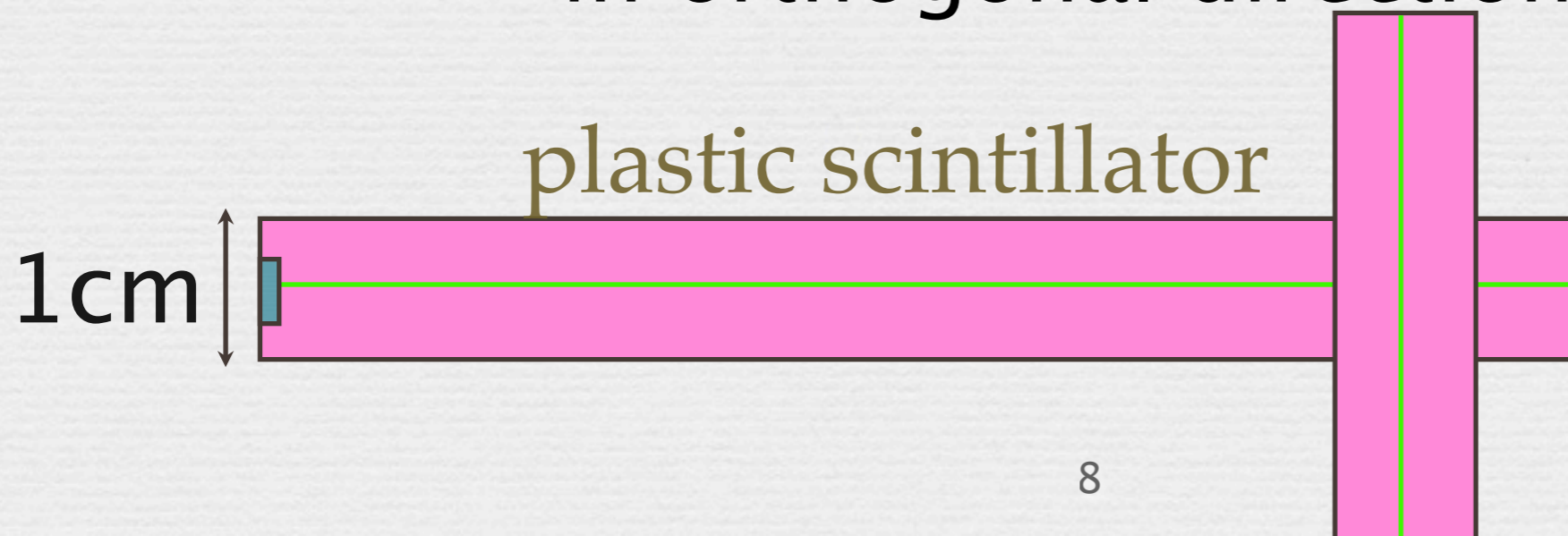


Hadron shower reconstruction

- Tracking with fine segmentation in 3D



1cm x 1cm spacial resolution with strip scintillators in orthogonal directions



New Budget for CAL

ECAL : Silicon (Kyushu) / scintillator (Shinshu) & Hybrid

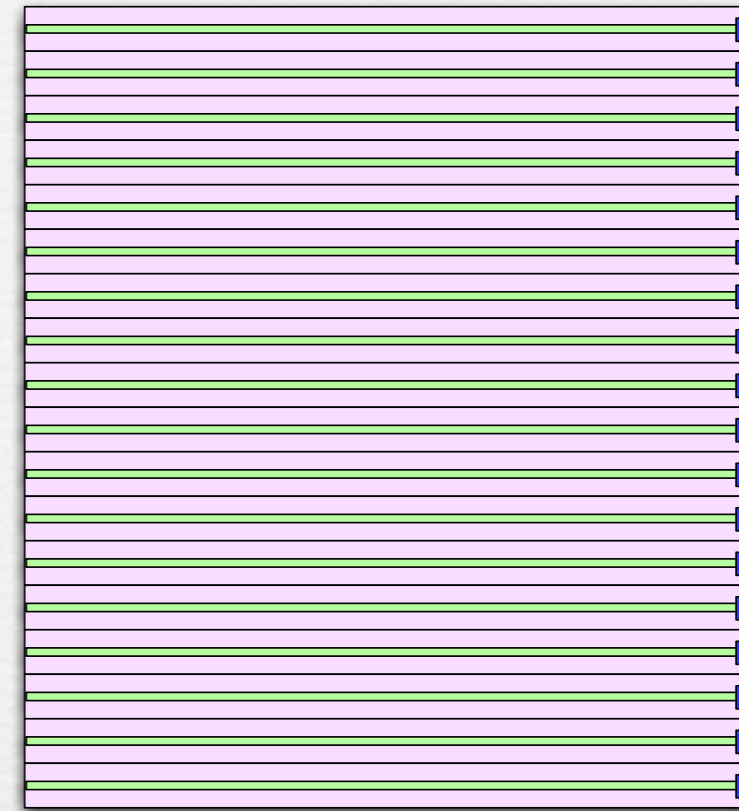
shown at
Heidelberg

HCAL : long scintillator strip

| 2011 – 2012 | 2013 – 2014 – 2015 post DBD |
|---|--|
| Hybrid ECAL silicon+scintillator | structure /readout & silicon sensor |
| simulation/BT | scintillator sensor mass production study |
| HCAL scintillator strip + tile optimization (simulation) | evaluation with BT |
| | scintillator sensor mass production study |

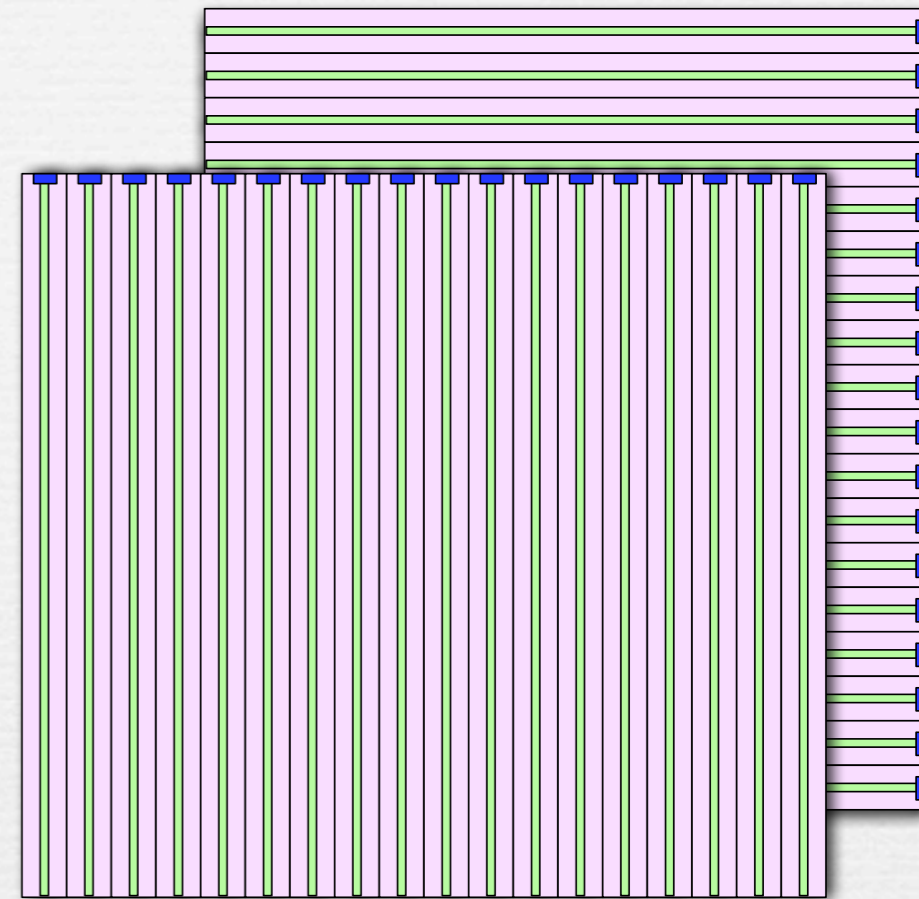
strip HCAL

- - long strip scintillator for HCAL
- aiming 1 cm x 1 cm effective resolution
- - with WLSF read out
- - expertise technology
- - start from Strip Splitting Algorithm for hadron interactions
- - two layers are constructed and tested



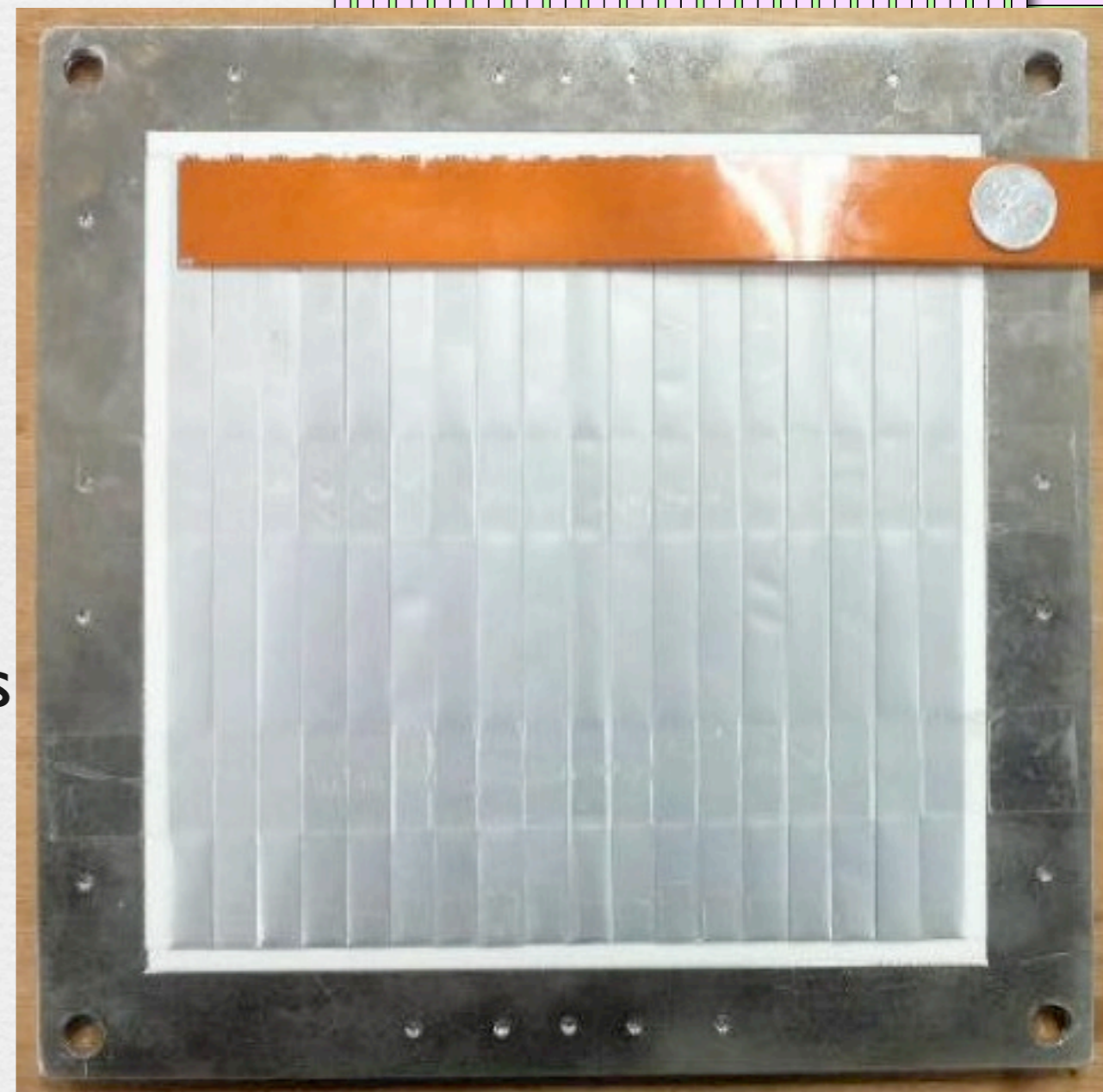
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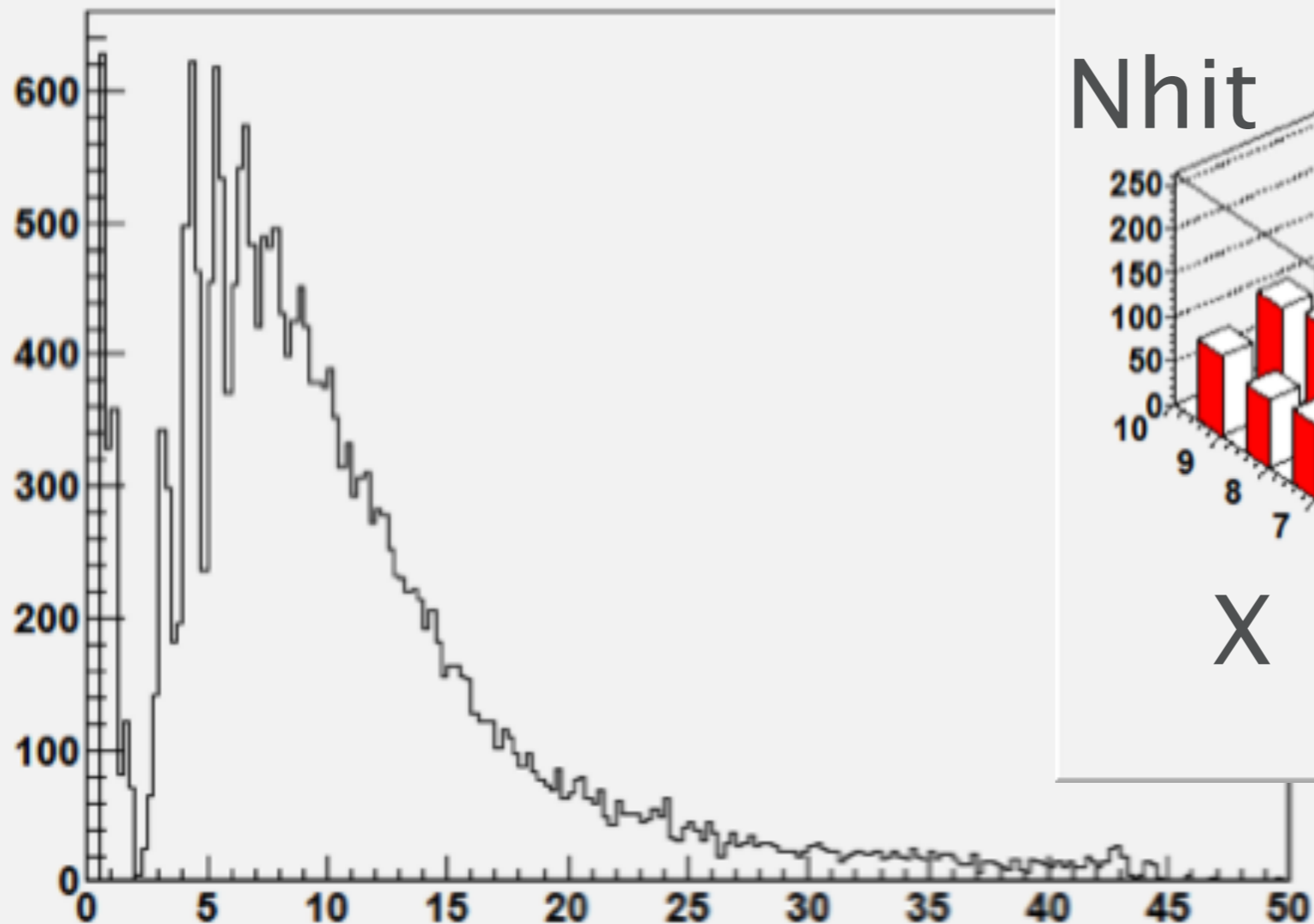


strip HCAL cont.

☞ cosmic ray test

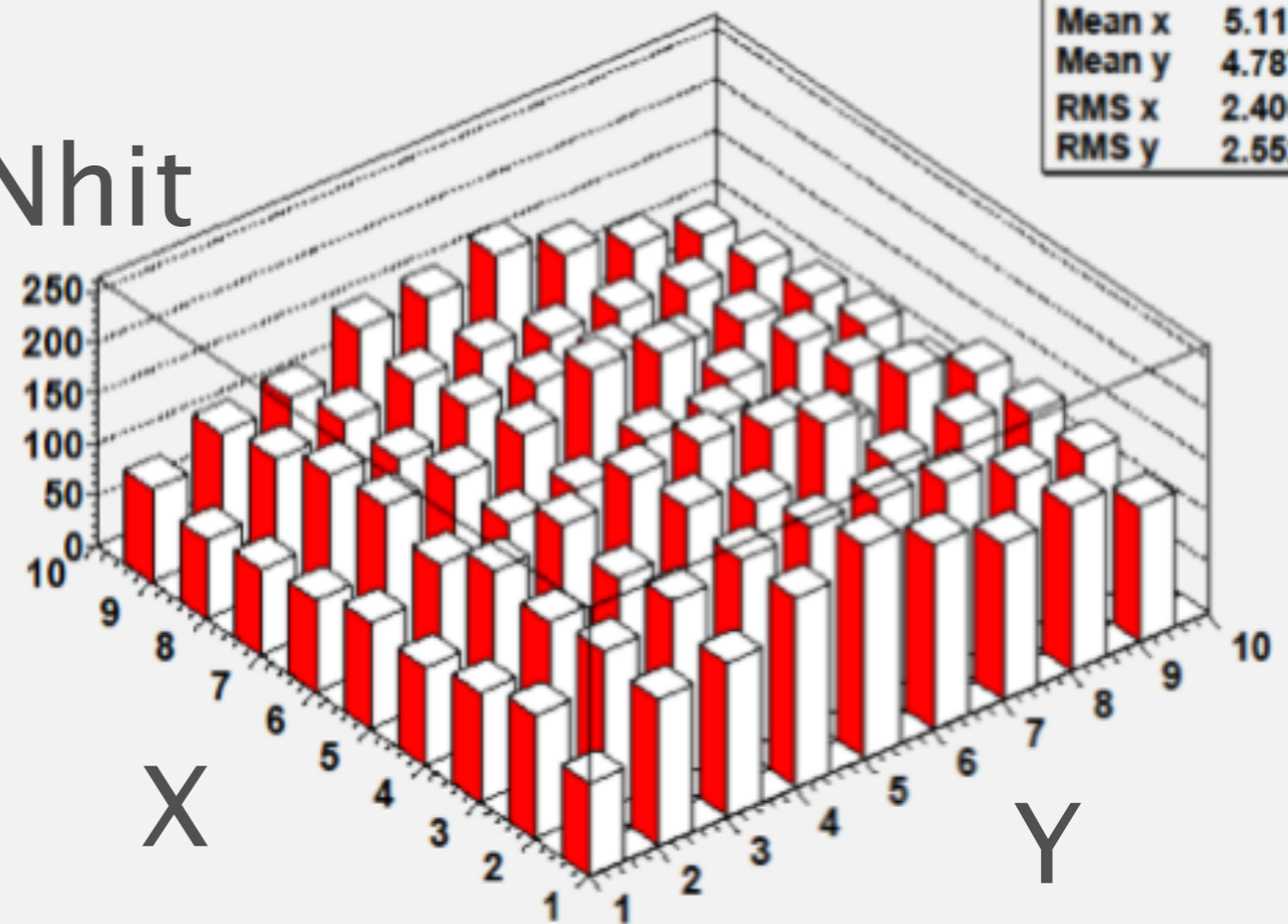
7.2 p.e. for 18 strips

18 scintillators



1cm x 1cm resolution

Nhit



TT-calice 2011@ Heidelberg

summary and outlook

- we propose **HCAL with strip scintillator**
 - strip scintillator technology established
 - SSA study and performance demonstration
 - optimization for length and width of strips
 - prototype HCAL construction and beam test
- budget available

